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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/955,470 | 09/18/2001 | Andreas Blumhofer | SCHWP0147US | 7741 |

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07/23/2003

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EXAMINER

SONG, HOON K

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 07/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/955,470

Applicant(s)

BLUMHOFFER ET AL.

Examiner

Hoon Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-20 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7. 6) ☐ Other:

DETAILED ACTION

Specification

This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

The disclosure is objected to because of the following informalities:

Headings for each sections are missing.

Appropriate correction is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-13 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy et al. (US 6125164) in view of Sturm et al. (US 5315630).

Regarding claims 1, 5-6, 7-10 and 12, Murphy teaches a method for accurately positioning a patient for radiotherapy and/or radiosurgery, comprising the following steps:

- a) the patient is pre-positioned as accurately as possible with respect to a

linear accelerator;

- b) at least two x-ray images of the patient and/or one of the parts of his body in the vicinity of the radiation target point are produced from different respective recording angles on a single image recorder (column 5 line 1+);
- c) the x-ray image is spatially localized (column 5 line 5+);
- d) at least one reconstructed image, corresponding to each x-ray image and deriving from a three-dimensional patient scan data set, is produced, the reconstructed images giving the desired image content of the respective x-ray image when the patient is correctly positioned (column 5 line 15+);
- f) the position of the patient is corrected by way of the determined positioning error (column 6 line 1-14).

However, Murphy fails to teach that the reconstructed images and the x-ray images are superimposed using landmarks. Instead Murphy teaches that detecting the position error by comparing the two feature vectors using a mathematical equation (column 5 line 1-41).

Sturm teaches a method of superimposing using landmarks.

In view of Sturm, one would be motivated to adopt the superimposing method because Murphy's mathematical equation is functionally equivalent to superimposing the images. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Murphy 's invention and discloses superimposing the reconstructed image and the x-ray image and detecting the positional error electronically or computer controlled on the basis of special landmarks

in both images because it would provide functionally equivalent of preventing treatment with misalignment between apparatus and body part (column 2 line 5+)

Regarding claim 2, Murphy teaches that the x-ray images are produced in positions defined offset with respect to the pre-positioning, outside of the radiation range of the linear accelerator, the reconstructed images being produced with the same offset (column 5 line 12+).

Regarding claim 3, Murphy teaches that the defined offset is compensated for by correcting the position of the patient (column 5 line 12+).

Regarding claim 4, Murphy teaches that the x-ray images are produced at an oblique angle on an image recorder spatially arranged horizontally, and projected back onto each respectively defined normal plane, the corresponding reconstructed images being likewise produced in these normal planes (figure 8 and 9).

Regarding claim 11, Murphy teaches that the reconstructed images is/are produced as:

- Digitally Reconstructed Radiographs (DRRs);
- Digitally Composited Radiographs (DCRs);
- MIP images,

or as any two-dimensional image reconstruction from a three-dimensional patient scan data set (column 4 line 36+).

Regarding claim 13, Murphy teaches that the position of the patient is corrected by manually guiding the table (column 3 line 35+).

Regarding claim 15, Murphy teaches a device for accurately positioning a patient for radiotherapy and/or radiosurgery, comprising:

- a) at least two x-ray sources (42) with which x-ray images of the patient (P) and/or one of the parts of his body in the vicinity of the radiation target point (tumor) may be produced from respectively different recording angles;
- b) a means by which the x-ray image may be spatially localised;
- c) a means by which at least one reconstructed image, corresponding to each x-ray image and deriving from a three-dimensional patient scan data set, may be produced;
- e) a means by which the position of the patient is corrected with respect to a linear accelerator (1) by way of the determined positioning error, characterized in that
- f) the device comprises only one image recorder (6), with which the x-ray images of both x-ray sources are produced.

However, Murphy fails to teach that the reconstructed images and the x-ray images are superimposed using landmarks. Instead Murphy teaches that detecting the position error by comparing the two feature vectors using a mathematical equation (column 5 line 1-41).

Sturm teaches a method of superimposing using landmarks.

In view of Sturm, one would be motivated to adopt the superimposing method because Murphy's mathematical equation is functionally equivalent to superimposing the images. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Murphy 's invention and discloses

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superimposing the reconstructed image and the x-ray image and detecting the positional error electronically or computer controlled on the basis of special landmarks in both images because it would provide functionally equivalent of preventing treatment with misalignment between apparatus and body part (column 2 line 5+)

Regarding claim 16, Murphy teaches that the image recorder is an image intensifier or detector, in particular comprising amorphous silicon (CCD).

Regarding claim 17, Murphy teaches that the image recorder is positioned on a support for a movable patient table (figure 3).

Regarding claim 18, Murphy teaches that the image recorder may be moved vertically together with the patient table and the support, while it is securely arranged horizontally (figure 3).

Regarding claim 19, Murphy teaches that the two x-ray sources (42) are arranged respectively over a patient table, in particular fixed to the ceiling, and to the side (figure 3).

Regarding claim 20, Murphy teaches that the two x-ray sources (42) are arranged respectively beneath a patient table (4), and to the side, the image recorder being positioned above the patient table (figure 3)

Allowable Subject Matter

Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 14, None of the prior art teaches or suggests that a multitude of images over a breathing cycle are produced from each angle, each time x-ray image are produced from the different recording angles, the breath-dependent movement of the markings arranged on the patient or in the vicinity of the radiation target being tracked by a navigation and tracking system with computer and camera guidance and referenced with the dynamic shifting of the target point directly or indirectly (e.g. via implanted markers) visible in the images, in order to take into account the breath-dependent shifting of the target point during irradiation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 703-308-4858. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

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Hoon Song
July 11, 2003


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Supervisor EXAMINER
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